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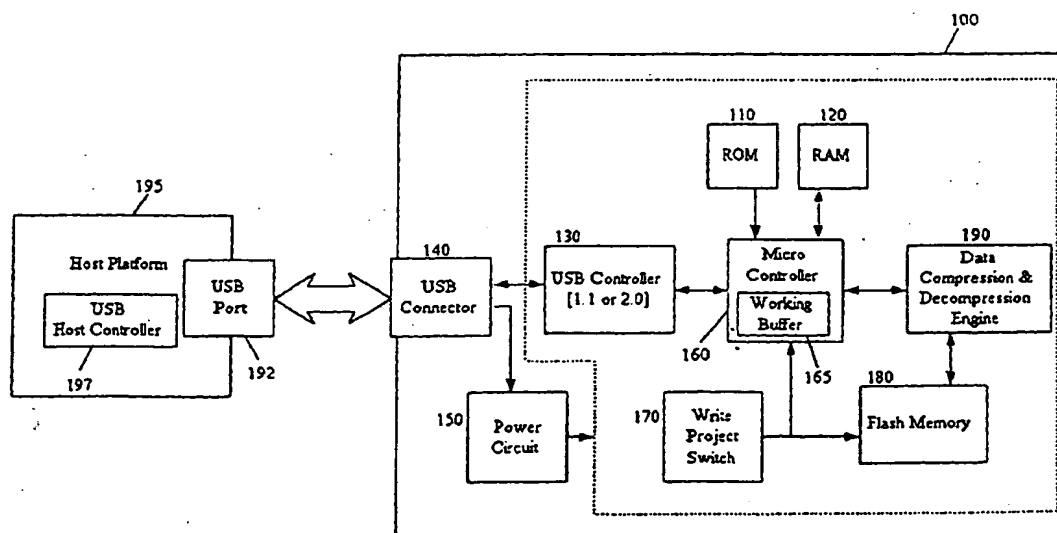
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- (74) Agent: **WATKIN, Timothy, Lawrence, Harvey**; Lloyd Wise, Tanjong Pagar, P.O. Box 636, Singapore 910816 (SG).
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- (71) Applicant (for all designated States except US): **TREK 2000 INTERNATIONAL LTD.** [SG/SG]; 30 Loyang Way #07-13/14/15, Loyang Industrial Estate, Singapore 508769 (SG).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **POO, Teng, Pin** [MY/SG]; c/o Trek 2000 International Ltd., 30 Loyang Way #07-13/14/15, Loyang Industrial Estate, Singapore 508769 (SG).
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[Continued on next page]

(54) Title: **SYSTEM AND APPARATUS FOR COMPRESSING AND DECOMPRESSING DATA STORED TO A PORTABLE DATA STORAGE DEVICE**



(57) Abstract: A portable memory device is provided that is capable of easy connection to a personal computer via a universal serial bus (USB) port, IEEE 1394 (i.e., firewire) or similar port. Included in the portable memory device is a compression/decompression engine capable of compressing and decompressing data. Data residing on a personal computer or other host platform is compressed by the engine and saved to the memory of the portable memory device. Compressed data is retrieved and decompressed by the engine and transmitted to the personal computer for use by the user. Embodiments of the present invention thus provide a highly convenient system and apparatus for users to access and save larger quantities of data to a relatively small device.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**SYSTEM AND APPARATUS FOR COMPRESSING AND DECOMPRESSING DATA  
STORED TO A PORTABLE DATA STORAGE DEVICE**

**CROSS REFERENCE TO RELATED APPLICATIONS**

5

The present application is related to the following United States patent applications, each of which is owned by the assignee of the present invention and is incorporated by reference in its entirety herein:

U.S. Patent Application Serial No. 09/803,173, entitled "PORTABLE DATA  
10 STORAGE DEVICE CAPABLE OF BEING DIRECTLY CONNECTED VIA USB PLUG  
TO A COMPUTER"; U.S. Patent Application Serial No. 09/803,157, entitled "PORTABLE  
DATA STORAGE DEVICE HAVING SECURE MODE OF OPERATION"; U.S. Patent  
Application Serial No. 09/898,365, entitled "A PORTABLE DEVICE HAVING  
BIOMETRICS-BASED AUTHENTICATION CAPABILITIES"; and U.S. Patent  
15 Application Serial No. 09/898,310, entitled "A PORTABLE DEVICE HAVING  
IOMETRICS-BASED AUTHENTICATION CAPABILITIES".

**BACKGROUND OF THE INVENTION**

20 **FIELD OF THE INVENTION**

The present invention relates to the field of storage of electronic data. More particularly, the present invention relates to the compression and decompression of data stored to a portable memory device.

**BACKGROUND OF THE INVENTION**

25 Portable memory devices, sometimes referred to as "key chain" memory devices or Thumbdrives™ (which is a trademark of the assignee of the present invention), are small portable data storage devices. These devices have become a class of indispensable computer peripherals that are widely utilized in business, educational and home computing. These devices are very small in comparison with other data storage devices such as personal  
30 computers (PCs), personal digital assistants (PDAs), magnetic disks, or compact disks (CDs). Indeed, the name "keychain" memory device describes the devices as similar in size to a key. Portable memory devices are generally not permanently fitted to a particular host platform,

such as a PC. Rather, they can be conveniently attached to and removed from any computer having the appropriate connection port (e.g., a serial bus port like a USB port, or IEEE 1394 port ("Firewire")). Thus, these portable data storage devices enable a user to transfer data among different computers that are not otherwise connected. Because these devices utilize a non-volatile solid-state memory (e.g., flash memory) as the storage medium, they do not require moving parts or a mechanical drive mechanism for accessing data. The absence of a drive mechanism enables portable data storage devices to be more compact than surface storage devices such as magnetic disks and CDs. Also, because there are no moving parts; reading and writing to the memory can be done much more rapidly than to magnetic disks and CDs. Portable data storage devices also have a much higher memory capacity than magnetic disks, holding up to 256 megabytes, as compared to 1.4 megabytes for magnetic disks.

Although storing data to a portable memory device has proven useful, the utility of these devices is limited by their inability to store larger quantities of data without increasing their size.

## 15 SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a system and apparatus that enables users to save larger quantities of data to a portable memory device than the current state of the art would allow. This would allow manufacturers to increase the amount of data that can be stored to the memory of these devices without increasing the physical size of the memory and thus the size of the devices. Additionally, this would have the added benefit of allowing manufacturers to decrease the size of these devices without decreasing the amount of data that such devices are capable of storing.

These and other objects are achieved by the present invention comprising a portable memory device that is capable of easy connection to a host platform such as a PC via a USB port, IEEE 1394 (i.e., firewire) or similar port. Included in the device is flash memory, read-only-memory (ROM), random-access-memory (RAM), USB controller, and a micro controller. In addition, a data compression and decompression engine is included in the portable memory device to compress/decompress data as it is stored and retrieved from memory.

8. The method as in claim 7 wherein the user thereof is not aware that the data is being compressed.

9. The method as in claim 7 wherein the compressing step comprises compressing the data to 50 percent of its original size.

5 10. The method as in claim 7 further comprising the step of increasing the capacity of the memory by 100%.

11. The method as in claim 7 wherein the user thereof can enable and disable the compression engine.

10 12. A method of decompressing data saved to the memory of the portable memory device, the method comprising the steps of:

(a) connecting the portable data storage device directly to a communication port of the personal computer via a universal serial bus (USB);

(b) executing a data compression/decompression engine residing on the portable storage device; and

15 (c) retrieving the compressed data from the memory of the portable data storage device;

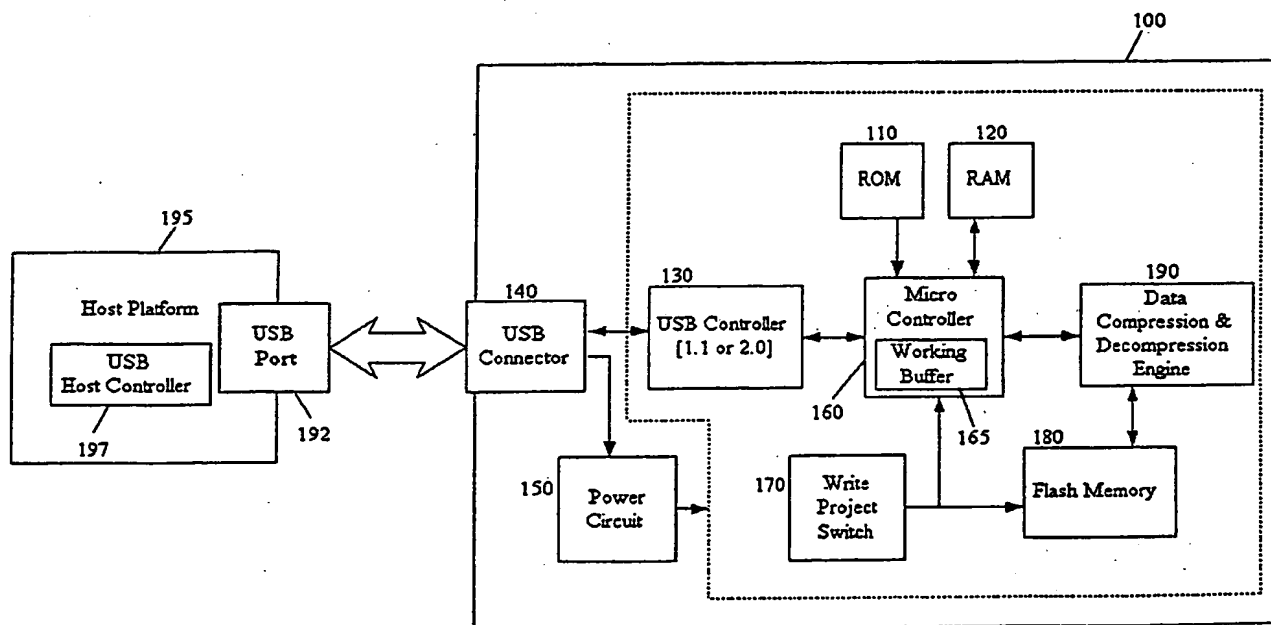
(d) decompressing the data; and

(e) transmitting the data to the host platform.

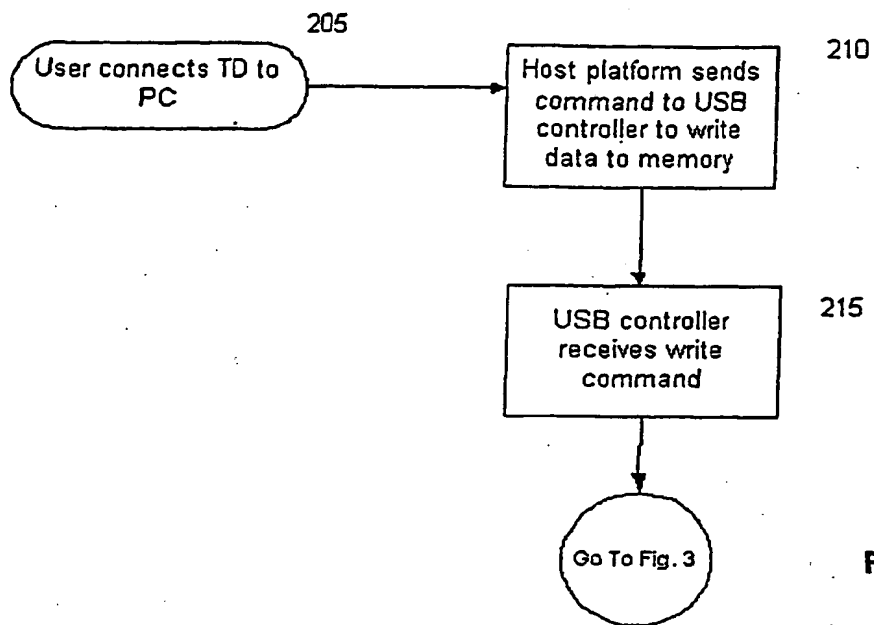
20 11. The method as in claim 10 wherein the user thereof can enable and disable the compression engine.

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Figure 1



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**Fig. 2**

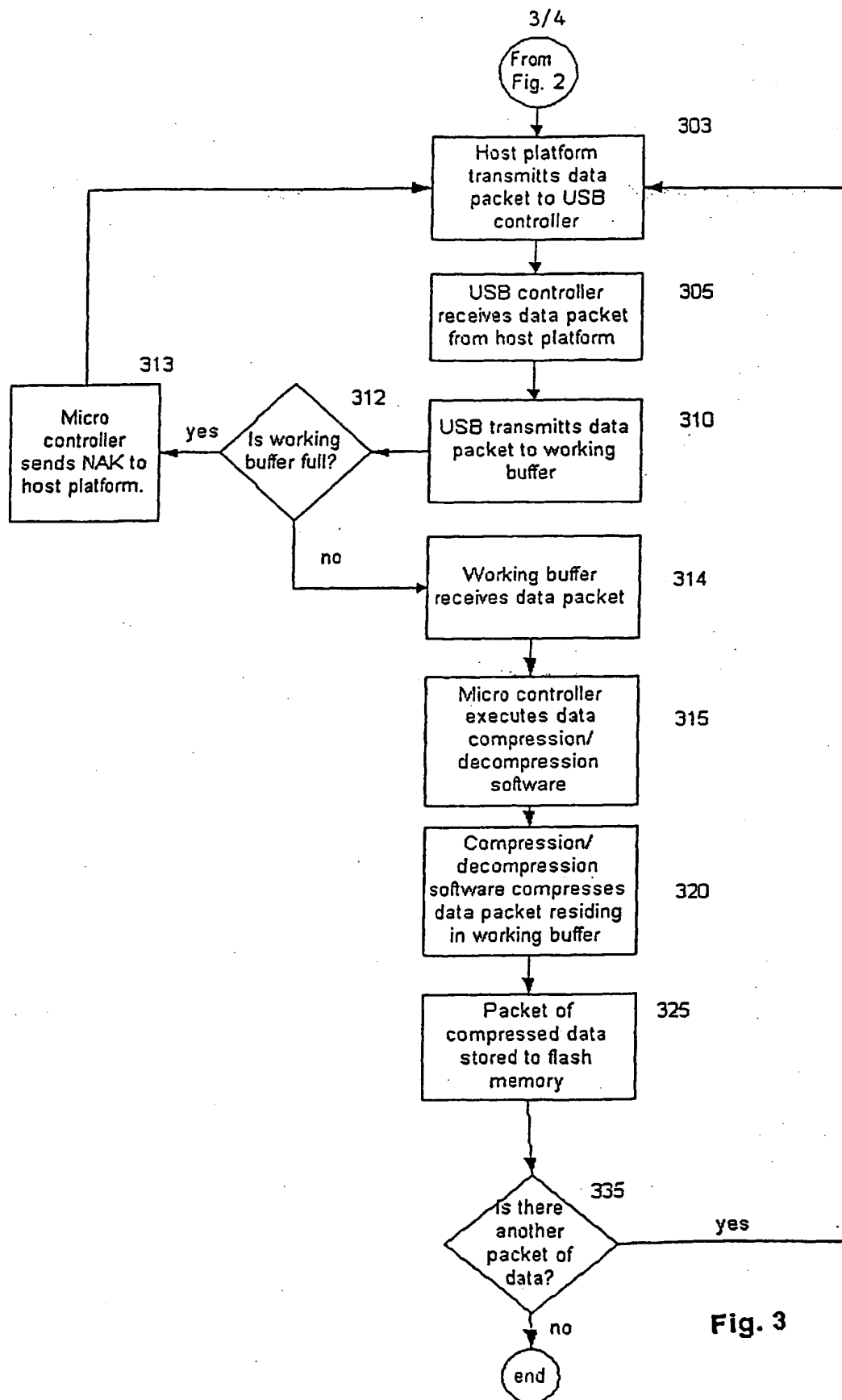


Fig. 3



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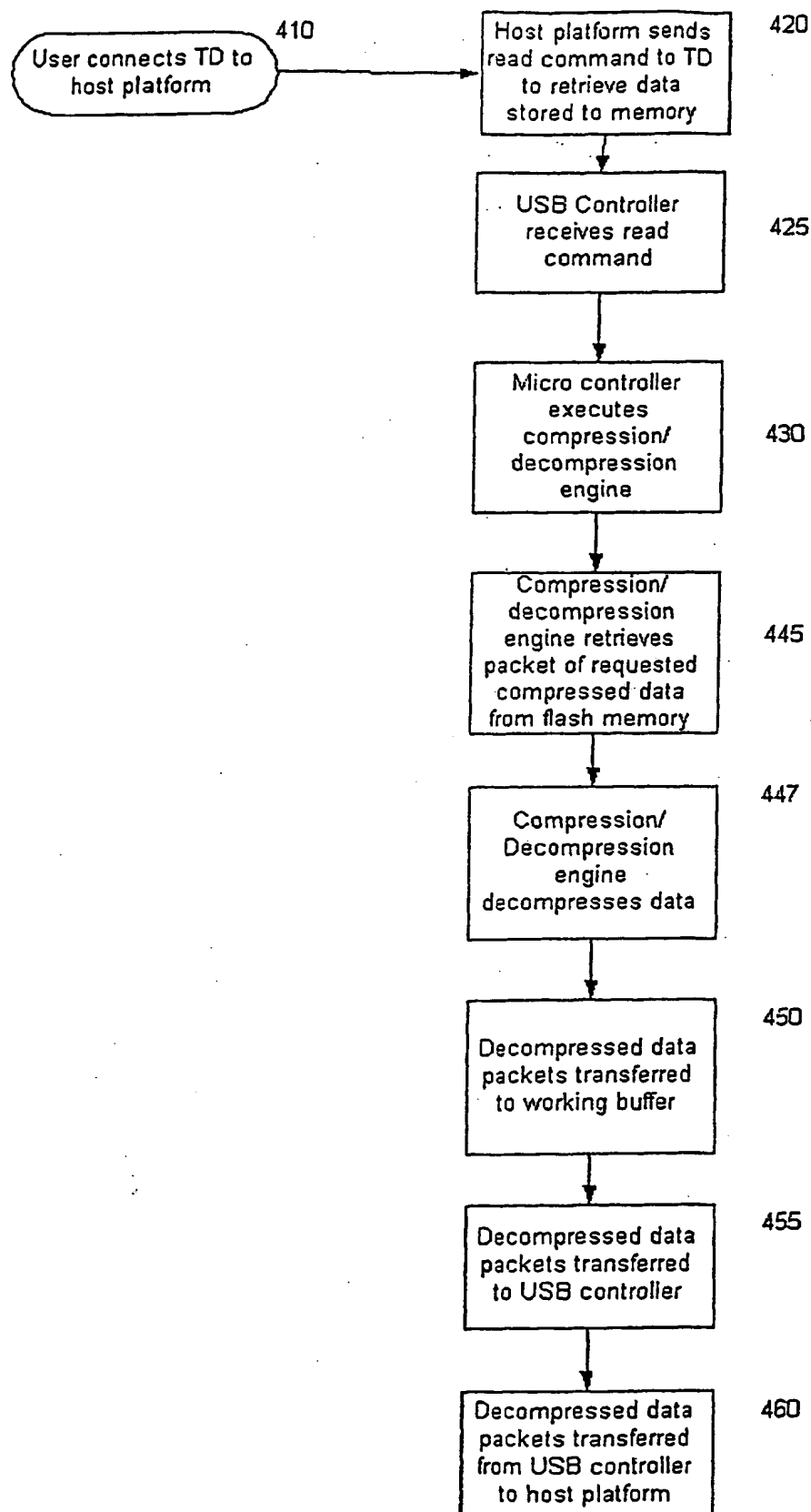


Fig. 4

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SG 02/00086

## CLASSIFICATION OF SUBJECT MATTER

IPC<sup>7</sup>: G06F 13/00, G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: G06F, G11B, G05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

wpi paj epodoc

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/73570 A (TELEGATE) 4 October 2001 (04.10.01) <i>the whole document.</i>	1-11
A	WO 01/86640 A (MINDS WORK) 15 November 2001 (15.11.01) <i>abstract.</i>	1-11
A	WO 01/61692 A (TREK TECHNOLOGY) 23 August 2001 (23.08.01) <i>abstract.</i>	1-11

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

„A“ document defining the general state of the art which is not

considered to be of particular relevance

„E“ earlier application or patent but published on or after the international

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„L“ document which may throw doubts on priority claim(s) or which is

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special reason (as specified)

„O“ document referring to an oral disclosure, use, exhibition or other

means

„P“ document published prior to the international filing date but later than

the priority date claimed

„T“ later document published after the international filing date or priority

date and not in conflict with the application but cited to understand

the principle or theory underlying the invention

„X“ document of particular relevance; the claimed invention cannot be

considered novel or cannot be considered to involve an inventive step

when the document is taken alone

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considered to involve an inventive step when the document is

combined with one or more other such documents, such combination

being obvious to a person skilled in the art

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Name and mailing address of the ISA/AT

Austrian Patent Office

Kohlmarkt 8-10; A-1014 Vienna

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Authorized officer

WERNER J.

Telephone No. 1/53424/357

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Information on patent family members

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Patent document cited in search report			Publication date	Patent family member(s)	Publication date
WO	A	161692		none	
WO	A	173570		none	
WO	A	186640		none	